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Mr. Chairman, Mr. Ranking Member, and Members of the Subcommittee, I appreciate the opportunity to appear before you today. I am Jeff Kueter, President of the George C. Marshall Institute. The George Marshall Institute is a 501(c)(3) non-profit organization founded in 1984, focused on how science is used in making public policy. The Institute's analyses are designed to improve the comprehension of the public, the media, and policy makers of important scientific and technical issues and help them distinguish between opinion and scientific fact so that decisions on public policy issues can be based on solid, factual information, rather than opinion or unproven hypotheses. We publish reports and host roundtables and workshops. Our activities focus on the environment and national security topics, with a particular emphasis on ballistic missile defense and space security.

The Marshall Institute's National Security Space Project (http://www.marshall.org/category.php?id=8) examines the implications of the U.S. reliance on space assets.

The Changed Security Environment in Space

Just how reliant the United States is on its satellites is neither well understood nor appreciated fully. "Space capabilities are inextricably woven into the fabric of American security, scientific, and economic activities," Lieutenant General C. Robert Kehler, the deputy commander of U.S. Strategic Command, told a congressional subcommittee in 2006. Gen. Kehler's summation confirms what we have all seen with our own eyes – the U.S. has fused its land-based conventional power projection capabilities with its space-based communications, navigation and reconnaissance capabilities.

What is not completely appreciated by the American public, but clearly is by the Chinese and others, is how different this use of space is and what it means for the strategic environment. Today's space systems fill (1) environmental monitoring; (2) communications; (3) position, navigation, and timing; (4) integrated tactical warning and

attack assessment; and (5) intelligence, surveillance, and reconnaissance missions. These missions are integral to a new American way of warfare. This "way of warfare" requires less manpower, puts fewer U.S. forces in harm's way, and integrates all of these space-based missions into real-time boots on the ground and stand-off precision strike operations. By fulfilling real-time warfighting needs as well as the broader strategic reconnaissance and intelligence missions, space assets no longer just tell us where people are and what they are doing; they are integrated with and improve the effectiveness of the weapon systems used to target and destroy. They are part of the weapon system, and not an insignificant part at that.

Any serious discussion of policy options must begin by moving beyond a tired lexical dispute. Discussions about space security are cluttered with commentators and advocates fretting about the potential implications of "militarizing" and "weaponizing" space. But it is too late: space is already militarized and weaponized. These terms assumed precise meanings during the Cold War and subsequent debates, but discussion of the lexicon never fully grappled with the underlying security dilemma. The militarization of space, or the use of space for military purpose, occurred as an outgrowth of the integration of space-enabled capabilities into terrestrial weapons systems. The aforementioned space-enabled reconnaissance strike complex which emerged during the first Gulf War effectively militarized space. The weaponization of space is more nuanced. The most common understanding of the phrase "weaponizing space" involves the placement of weapon systems into orbit or development of weapons which fire into space. Weapon systems are already in orbit. They are not anti-satellite or missile defense systems, development of both was effectively blocked by the arms control community for years, but instead, they are the existing suite of space assets. The integration of space capabilities into terrestrial warfighting assets is essential and indispensable to the functioning of those weapons. Without GPS, stand-off precision strike, the backbone of American warfighting, fails to function. Put another way, the reconnaissance strike complex does not work unless it is space-enabled. Chinese strategic thinking provides additional support for the view that defines space systems as weapons in information-age warfare.

From a more traditional perspective, China's direct ascent anti-satellite (ASAT) test on January 11, 2007, weaponized space and potentially so does every long-range ballistic missile in the world. There is no doubt that space is now weaponized. China's test prompted arguments over whether an earth-launched ASAT is really "a space weapon." The contention that a ground-based system is not a space weapon because it is not launched "from" space ignores the practical reality that an ASAT launched from either the ground or from space brings war to space. Understanding how China weaponized space is simple, the missile it launched destroyed an asset on orbit. Ballistic missiles, which are principally designed to strike terrestrial targets, are space weapons under the traditional definition because they can be fired into space and they transit through space to their targets. More broadly, electronic attacks on data transmissions and destruction of ground stations are attacks against space systems. But are they space weapons? Not in the traditional sense, but their effects are just the same. In the end, the silicon revolution overtook the tired debates about the militarization and weaponization

of space that produced so much angst during the Cold War. Debate over the nuances of the lexicon may continue, but the threat to the United States remains the same.

This integration of space assets with terrestrial power projection capabilities remains a uniquely American strength and provides a clear incentive for attacking American spacecraft. U.S dependence on space for national and tactical intelligence, military operations, and civil and commercial benefits far exceeds that of any other country. In this new environment, a "scorched space" attack or a space "Pearl Harbor" would hurt the U.S. most of all.

The numerous vulnerabilities of space systems make such a strategy possible. The physical destruction or disabling of a space asset is the most direct means of attack. Physical destruction can be accomplished by intentional strikes against ground stations, launch systems, or orbiting satellites. Ground stations are essential to the function of a space system. Without the ability to receive information sent from space, the utility of satellite systems is severely constrained.

There are ways to directly target space systems in orbit although it is expensive and technically challenging. Unlike an attack on a ground station, where the transmitting data can be rerouted to another receiving station eventually, once the satellite is destroyed or damaged, it can not be replaced quickly, easily or cheaply. Given the length of time needed to launch a replacement satellite and the high probability that a replacement would not be available, an adversary that can disable a sufficient number of U.S. satellites could expect to reap advantages in the short-term.

The Chinese demonstrated a direct ascent anti-satellite capability, wherein an object is launched from Earth at a target flying overhead in space. The destruction of the orbiting satellite is achieved using kinetic energy, i.e., the object launched from Earth slams into the targeted satellite and the energy created by the collision of two fast moving objects destroys both. Kinetic kill interceptions are well understood and were demonstrated by both the U.S. and Soviet Union during the Cold War.

Other techniques to destroy satellites include co-orbital ASATs, which are placed into orbit where they wait for a period of time before they are sent to destroy their target. The emergence and proliferation of microsatellite technologies has given rise to fears of their use as parasitic co-orbital ASATs satellites. Many nations, including China, have active microsatellite programs, but there is little public evidence to reveal China's intentions beyond the acknowledged peaceful and commercial purposes. The Soviet Union built and tested co-orbital ASATs in the 1970s and early 1980s. The Soviet system is said to have reached full operational capability in 1972. While microsatellites imply some capabilities in this area and Chinese military writings recognize the utility of the parasitic concept, the technical challenges of maneuvering in space should not be overlooked. Lasers, particle beams, and radio frequency weapons constitute another category of ASATs capable of inflicting physical damage. They all have stand-off ASAT capabilities when deployed on platforms in space. The United States demonstrated the

vulnerability of satellites to these directed energy techniques in a 1987 test of the MIRACL ground-based laser.

Another type of physical threat to space assets is high-altitude nuclear detonation. In this scenario, an attacking nation would launch a ballistic missile armed with a nuclear warhead into space and explode it there. All satellites within the line of sight of the explosion would be killed promptly, with the effects dissipating with distance from the explosion. The radiation released in the explosion provides a gradually fatal dose to non-hardened satellites over weeks to months. Most U.S. satellites, particularly those commercial assets used extensively for defense communications, are not hardened to withstand this kind of attack and lack the maneuvering capabilities needed to "get out of the way" of the attacking missile in-flight, the explosion or out of the radioactive effects. An attack using multiple launches could have devastating impacts on military and commercial satellites. China certainly has the missile and nuclear capabilities to bring about a high-altitude nuclear explosion, as do several other countries. This most extreme action would likely occur only in times of acute international crisis.

Space systems also are vulnerable to disruption, which could preclude or deny their use when desired. Satellites use electromagnetic energy to send data and information from the satellite to ground. Disruptive attacks use electronic means to disturb these transmissions by jamming the transmission or "spoofing" it. Jamming impedes the communication between the satellite and user by blocking or drowning out the transmission. Simple jammers are cheap and easy to obtain, but the U.S. military and commercial users have ways to prevent some of these attacks. Spoofing occurs when fake signals are sent. These faked signals have all the appearances of legitimate data coming to or from the satellite. Spoofing is more difficult to achieve because the faked signals must appear genuine. Encryption is one of the means used to protect against spoofing.

These are not hypothetical concerns. Last year, prior to the revelations about China's robust capabilities, Gen. Kehler told a House subcommittee that "GPS jamming has occurred as has jamming of commercial telecommunications satellites ... Open source reporting has cited examples of incidents, both intentional and unintentional, that have impacted space capabilities ..." Well publicized instances include the jamming of a Chinese satellite by Falun Gong in 2002; Iran's jamming of Telstar-12, a commercial communications satellite, from Cuba in 2003; Libya's jamming of Loral-Skynet and Telstar satellites in 2005; and Iran's jamming of a French satellite also in 2005.

General Kehler summarized the state of affairs clearly when he said that "while none of these incidents proved catastrophic, our enemies clearly understand the reliance we place on space capabilities and we should expect the level and sophistication of efforts to deny us the advantages of space to increase in future conflicts."

The Chinese Challenge

On January 11, 2007, China tested a direct ascent ASAT system. The target, a Chinese weather satellite, was destroyed, reportedly producing some 900 trackable pieces of space debris in orbits from 125 miles to about 2,300 miles and resulting in an increase of 10 percent in the total amount of manmade debris in orbit. This demonstration was just the latest in a series of tests of China's space weapons program and is a warning sign to the United States.

Nor is this system the only space weapons program under development in China. Last September reports surfaced that China successfully conducted a laser blinding test against a U.S. reconnaissance satellite. Further investigation revealed that these blinding tests had been ongoing for several years. The intention of these blinding tests is to demonstrate the capability to find, track, and illuminate U.S. spy satellites. Blinding an overflying spy-satellite's optical and infra-red imaging systems could result in either temporary or permanent damage, depending upon the delivered power of the beam and the sensitivity and protections built into the satellite's sensors.

China has made no secret of its efforts to develop techniques to jam navigation satellites. Technical journals published by the People's Liberation Army (PLA) discuss the use of broad-spectrum or narrow-frequency jamming. Some PLA journals contain many articles focused on how to jam synthetic aperture radars in space, which are the same kind of radars used by the U.S. for intelligence collection and missile launch warning.

Reports about China's programs to design parasitic microsatellites satellites and the ability to collide satellites with other satellites appeared in 2001. It is feared that these small, maneuverable satellites could approach U.S. satellites to either physically destroy them as a result of a collision or attach themselves to the U.S. satellite to somehow disable or jam it. Chinese technical journals contain articles discussing the theoretical algorithms needed to achieve maneuverability in space for the purpose of shifting orbits in order to rendezvous with other objects. While this capability is more speculative than the demonstrable direct kill, blinding, or jamming options already at their disposal, the microsatellite program combined with the interest in maneuverability and on-orbit collisions are strongly suggestive of serious investigation in such capabilities.

China's perceptions of its security environment and the nature of future conflicts explain their investment in military space capabilities. According to China's strategists, future wars will occur across multiple battle spaces, expanding from operation on the land, at sea and in the air to the electromagnetic spectra and into outer space. Future wars require widely spread forces, operating over large geographic areas, demonstrating precise operational coordination and timing, utilizing precision strike weaponry and operate at high operational tempo. U.S. strategists reached similar conclusions and these same characteristics are written into the Quadrennial Defense Review, embodied in the annual defense budget, and are reflected in the doctrines of the military services.

In modern warfare, information collection, transmission, management and analysis all occurs in or from space. The Chinese see American operations in Kuwait, the Balkans, Afghanistan and Iraq as exemplary models of these future war concepts. Analyses of China's strategic thinking by the Center for Naval Analyses, the U.S.-China Economic and Security Commission, and others show their recognition of the reliance of U.S. forces on space-based assets and, and more importantly, China's identification of U.S. space capabilities as a vital element of U.S. military power.

Based on these analyses of Chinese writings, which are drawn from military textbooks, course materials and journals, scholars note China's aspiration to establish space dominance. They contend that achieving space dominance would allow China to protect its space systems and deny access to space to an opponent. The integration of space-enabled information into land, air, and naval warfare make control of space essential to success in future warfare. Chinese military leaders clearly understand that without control of space neither the PLA not an adversary could expect to assert air or naval dominance or win a ground war.

In a word, China is now unquestionably a rising space power. Not only does China have the capacity to exploit space for its own purposes, but the ASAT test demonstrated a Chinese capability to deny other nations that same ability. Future military success requires the ability to use space and deny its use to an opponent. The Chinese recognize space as an essential strategic high ground. Consequently, the same information technologies and improved sensor systems that make modern weapons much more destructive effectively make outer space a key battleground.

The National Space Policy

In light of this changed environment, how should we evaluate the National Space Policy? Released last October after many years in the making, the policy reiterates many long-standing principles of U.S. space policy and makes long-overdue changes in defining U.S. vital national interests in space. The policy charts a reasonable course, upholding established beliefs about safeguarding the security of the United States in space while preserving the flexibility needed to respond to the uncertain security environments of the future. The policy is not without its failings. It conspicuously lacks the decisive voice needed to safeguard America and her allies from rapidly emerging challenges in space and the manner in which it was released allowed others to interpret its meanings and implications, often improperly.

The new National Space Policy rightly balances the need for the U.S. to defend its interests in outer space with the desire for all to use space for peaceful purposes. The principles offered to guide U.S. actions are:

- The United States is committed to the exploration and use of outer space by all nations for peaceful purposes, and for the benefit of all humanity. Consistent with this principle, "peaceful purposes" allow U.S. defense and intelligence-related activities in pursuit of national interests;

- The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitations on the fundamental right of the United States to operate in and acquire data from space;
- The United States will seek to cooperate with other nations in the peaceful use of outer space to extend the benefits of space, enhance space exploration, and to protect and promote freedom around the world;
- The United States considers space systems to have the rights of passage through and operations in space without interference. Consistent with this principle, the United States will view purposeful interference with its space systems as an infringement on its rights;
- The United States considers space capabilities -- including the ground and space segments and supporting links -- vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests;
- The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests; and
- The United States is committed to encouraging and facilitating a growing and entrepreneurial U.S. commercial space sector. Toward that end, the United States Government will use U.S. commercial space capabilities to the maximum practical extent, consistent with national security.

At one level, the new national space policy makes some necessary and welcome improvements over the policy signed by President William J. Clinton in September 1996. These include the statement that the United States "considers space capabilities...vital to its national interests." The new policy also recognizes the importance of space in support of homeland security and the increasing criticality of the commercial space sector and enhanced space situational awareness. It also reaffirms the Administration's previous decision on civil space exploration.

At a more legalistic level, the policy performs the function of reiterating a number of long-standing principles of U.S. space policy, including the statement of a sovereign right to free use of outer space to support defense and intelligence-related activities. These stipulations help support the fundamental premise of the new National Space Policy:

> "In this new century, those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those

who do not. Freedom of action in space is as important to the United States as air power and sea power. In order to increase knowledge, discovery, economic prosperity, and to enhance the national security, the United States must have robust, effective, and efficient space capabilities."

In highlighting the principle of "freedom of action," the new policy reflects the experience of the past decade –when space-based navigation, communications and reconnaissance systems became key enablers for global power projection. History shows that any position at a pinnacle of power will soon be contested by other nations. This suggests that other nations will seek to counter America's asymmetric advantage in space, including the development and deployment of ground- and space-based anti-satellite weapons. In some cases, these activities may be accompanied by hypocritical hand-wringing over the "specter of an arms race in and the weaponization of outer space haunting the international community."[1]

Concerns about how to protect the satellites providing vital information about the closed Soviet and Chinese governments and territories have been a major element of presidential decision-making about space from the dawn of the space age. The sheer importance of space assets demanded their protection, as has been directed by Democratic and Republican presidents alike:[2]

- ". . . the President has reassessed U.S. policy regarding acquisition of an anti-satellite capability and has decided that the Soviets should not be allowed an exclusive sanctuary in space for critical military supporting satellites." (Ford, NSDM 345, 18 Jan 1977)
- "The United States will pursue activities in space in support of its right of self-defense." (Carter, PD/NSC 37, 11 May 1978)
- "The DOD will develop, operate, and maintain enduring space systems to ensure its freedom of action in space. This requires an integrated combination of anti-satellite, survivability, and surveillance capabilities." (Bush, NSD 30 (NSPD1), 2 Nov 1989)
- "Consistent with treaty obligations, the United States will develop, operate and maintain space control capabilities to ensure freedom of action in space and, if directed, deny such freedom of action to adversaries. These capabilities may also be enhanced by diplomatic, legal or military measures to preclude an adversary's hostile use of space systems and services. The U.S. will maintain and modernize space surveillance and associated battle management command, control, communications, computers, and intelligence to effectively detect, track, categorize, monitor, and characterize

[1] Cheng, Jinye, "Statement on Outer Space," Thematic Debate, First Committee, United Nations General Assembly, 61st Session, Oct. 11, 2006, http://www.reachingcriticalwill.org/political/1com/1com06/statements/chinaoct11.doc (accessed Nov. 2, 2006).

[2] All quotations are drawn from *National Security Space Project's Presidential Decisions: NSC Documents* (Washington, D.C.: George Marshall Institute, 2006).

threats to U.S. and friendly space systems and contribute to the protection of U.S. military activities." (Clinton PDD/NSC 49 (PDD/NSTC 8), 19 Sep 1996)

The new space policy reiterates this commitment to preserving and protecting U.S. assets in space, but, as it is the first space policy written for the age of the space-enabled reconnaissance strike complex, the policy rightly directs the national security establishment to "develop capabilities, plans, and options to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries." There is nothing new or unique about expressions of support for preservation of freedom of action in space. That goal draws its origins from the earliest days of the U.S. space program. Nor is there really anything unique about the direction to develop plans and options to deny freedom of action to adversaries. Even President Carter, who supported initially an international treaty banning anti-satellite capabilities, directed the Defense Department to "vigorously pursue development of an anti-satellite capability" and allowed for production of such systems, provided they were not excluded by a treaty.[3]

Nevertheless, this mandate in the new policy is widely interpreted as presaging the deployment of new U.S. space weapons, rather than for what it actually is, a reaffirmation of a continuing strategic approach.

The declaration that the U.S. "will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space" also is offered as evidence that the new policy is part of a nefarious framework to expand U.S. hegemony in space. Instead, it is simply a statement that the U.S. will not support international agreements that it considers contrary to its interests. It is not the blanket prohibition on arms control as is often asserted. Past space policies include similar qualifying language. For example, President Clinton's 1996 policy states: "The United States will consider, and, as appropriate, formulate policy positions on arms control and related measures governing activities in space, and will conclude agreements on such measures only if they are equitable, effectively verifiable, and enhance the security of the United States and our allies."[4] While more economical in the words used to express its views on international negotiations, the new space policy sends the same message as the old space policy – the United States will not become a party to an agreement that it feels is contrary to its interests.

The language on international agreements also reflects lessons drawn from the 1972 ABM Treaty as well as skepticism towards multilateral space disarmament efforts that provide cover for self-serving attempts by China and Russia to constrain the U.S., while doing nothing to restrict their own clandestine ASAT programs. Unfortunately, the policy was not accompanied by fuller discussion on how the U.S. would work with its allies to protect critical space infrastructures. The absence of such public discussions has

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[3] *National Security Space Project's Presidential Decisions: NSC Documents, Newly Declassified Excerpts* (George Marshall Institute: Washington, D.C., 2006), 6.

[4] *National Security Space Project's Presidential Decisions: NSC Documents* (Washington, D.C.: George Marshall Institute, 2006), 361-2.

produced confusion about our intentions in those countries that otherwise stand most closely with us.

Could the National Space Policy be improved? Undoubtedly, yes. The policy's tortuous phrasing and its release late in the president's second term suggest it is a compromise between political appointees and the bureaucracy. The unclassified guidelines provide little specific direction. In cases where guidance is more specific, it occurs in areas where presidential exhortation is largely irrelevant. The publicly-released document largely avoids explicit calls for action and fails to define clear outcomes for assuring freedom of navigation in space. Those textual ambiguities coupled with the botched marketing efforts largely explain the confusion, misinterpretation, and unfortunately, concern and distrust over U.S. intentions in space.

Responding to New Challenges

So the question now facing America's leaders is how does the U.S. best deter, deny, and dissuade the Chinese, and other emerging space powers, from hostile actions in space? The first step is wider recognition of the new reality in space to enable the public and political support necessary to begin serious work to protect critical space assets from both direct and indirect threats.

A new emphasis on policies and programs likely to improve our capabilities to respond and react to incidents in space is needed. In addition to improving our awareness of movements in and through space, the United States government would do well to invest in small satellite development and rapid launch capabilities, explore policy changes to allow greater exploitation of commercial systems, and encourage the development of allied space capabilities. This combination of actions, once achieved, would change the strategic calculations of prospective adversaries.

The United States must not foreclose the option of developing active defenses. For example, the Chinese ASAT test should "boost" the prospects for space-based missile defense. If the international community is truly worried about the debris-generating effects of ground-based ASAT weapons, then it ought to embrace, indeed demand, development and deployment of boost-phase missile defenses capable of intercepting ASAT missiles long before they reach their satellite targets. Combined with a new emphasis on satellite protection, ground-based replenishment capabilities and space-based missile defenses could frustrate any attempts to block the peaceful use of space by America and her allies.

Finally, diplomatic efforts can play important roles in preserving U.S. security. The growing interdependence between economic and security interests will necessitate improved cooperation between the U.S. government and commercial satellite operators. The United States also will need to coordinate its space protection activities with military and civil space authorities in allied and friendly nations. As information sharing advances, new norms for shared space situational awareness, debris mitigation and orbital traffic management may emerge among America and other responsible spacefaring

nations. However, the success of any norm requires parties to exhibit maturity, trustworthiness and a willingness to act responsibly – three preconditions which China has shown it is unable to support. Absent the ability to enforce compliance or punish offenders, a code of conduct rule regime will be weak and, more likely than not, ineffectual. A rules system for space that relies on voluntary compliance and lacks viable punitive measures will be a hollow one.

Further, diplomacy alone can not restore U.S. security. The significance of the broader diplomatic and economic relationship with China suggests that space incidents will be downplayed so as not to upset those concerns. Students of the Soviet ASAT program should not be surprised that the Chinese military's provocative ASAT development program was accompanied by hypocritical protestations over the specter of an arms race in and the weaponization of outer space. Russia and China are leaders of an international effort to construct a framework to govern space. The Chinese, of course, are leaders of the "Prevention of an Arms Race in Outer Space" (PAROS) treaty process at the United Nations. At the same time that their diplomatic corps raged against the supposed weaponization of space by the U.S., the Chinese government successfully executed their anti-satellite tests.

Still, some have constructed an interpretation of the recent events that shifts the focus from discussing China's culpability to one that blames the U.S. for forcing China's hand by interpreting U.S. policies as being intent on deploying weapons, characterizing U.S. actions as dangerous and provocative, condemning the U.S. refusal to enter into international negotiations, and concluding that only a treaty can restrain the U.S.'s aggressive tendencies. Fortunately, all those claims are wrong. These demands that the U.S. preemptively and unilaterally disarm itself in space are reminiscent of old Cold War debates over nuclear weapons recycled for a contemporary issue. Efforts to ban weapons in space are unenforceable and compliance to its strictures virtually unverifiable. The ignominious record of enforcing and verifying treaties prohibiting activities on Earth is proof enough to give pause to any conversation about a treaty governing activities in space. The difficult experiences of the United States and the Soviets in negotiating space control offer useful lessons for those advocating a return to that course today. Those negotiations collapsed, despite the participation of interested parties, because of the inability to reach agreement on basic definitional elements. The prospects for successful negotiations today, with substantially more nations involved and a much more complicated strategic environment in space, have to be considered remote.

Finally, these agreements fail to address the chief reason an adversary would seek access to space in the first place – namely, the potential for inflicting a crippling blow against U.S. military and economic might by decapitating its surveillance and communications abilities. Why would China abandon capabilities that hold the "soft underbelly" of American military power at risk? Their own words clearly show a concerted desire to develop such capabilities and provide the strategic rationale for them having done so. There is little reason to believe they would negotiate away that advantage. Instead, such agreement would likely weaken U.S. security by precluding the necessary development of space systems and doctrine.

Conclusion

Outer space can be preserved and balanced with the protection of the parochial interests of states to ensure free passage and access for all. The unique position of the United States today affords it the opportunity to take steps to ensure the defense of its interests. Such actions are not incompatible with the preservation of peace and stability. Indeed, history shows those goals to be the first order preferences of U.S. policy. Unfortunately, history also shows that others do not share that view. The inevitability of increased access to space creates new challenges for U.S. policy, challenges that must be confronted in a manner consistent with and supportive of U.S. national interests.

Thank you for the opportunity to appear here today and to present these views for your consideration.

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Mr. Jeff Kueter works with scientists to help improve the understanding and awareness of complex scientific topics to the public, the media, and policy makers. Focused on national security and the environmental topics, Mr. Kueter manages the day-to-day operations of the George C. Marshall Institute, authoring its policy papers and analyses and engaging the public and the policy making community. He received his B.A. in Political Science and Economics at the University of Iowa, where he graduated with honors, and an M.A. in Political Science and another M.A. in Security Policy Studies and Science & Technology Studies, both from George Washington University. He previously served as Research Director at the National Coalition for Advanced Manufacturing (NACFAM).